

**Claims**

1. An authoring method for use in creating an audiovisual product or content, comprising the steps of:

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defining a plurality of components, the components implicitly representing functional sections of audiovisual content with respect to one or more raw content objects, and a plurality of transitions that represent movements  
10 between the plurality of components;

expanding the plurality of components and the plurality of transitions to provide a set of explicitly realised AV assets and an expanded intermediate data  
15 structure of nodes and links, where each node is associated with an AV asset of the set and the links represent movement from one node to another; and

creating an audiovisual product or content in a  
20 predetermined output format, using the AV assets and the expanded intermediate data structure of the nodes and the links, wherein the audiovisual product comprises data representing a menu.

25 2. The method of claim 1, wherein the defining step comprises defining at least one information component that comprises a reference to a raw content object.

3. The method of claim 2, wherein the reference  
30 denotes a file path to a location where the raw content object is stored.

4. The method of any preceding claim, wherein the defining step comprises defining at least one choice component comprising a reference to at least one raw content object, and at least one authoring parameter.

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5. The method of claim 4, wherein the at least one authoring parameter is adapted to control a selection or modification of the at least one raw content object.

10 6. The method of claim 4 or 5, wherein the at least one authoring parameter comprises a runtime variable available during playback of the audiovisual product.

7. The method of claim 4, 5 or 6, wherein the at  
15 least one authoring parameter comprises an authoring-only parameter that will not be available during playback of the audiovisual product.

8. The method of any of claims 4 to 7, wherein the  
20 choice component comprises a reference to a presentation template and a reference to at least one substitutable raw content object to be placed in the template according to the at least one authoring parameter.

25 9. The method of any preceding claim, wherein the defining step comprises defining at least one meta-component representing a set of components and transitions.

30 10. The method of claim 9, wherein the at least one meta-component is a procedurally defined representation of the set of components and transitions.

11. The method of any preceding claim, wherein each transition represents a permissible movement from one component to another component.

5 12. The method of any preceding claim, wherein each transition is associated with a triggering event.

13. The method of claim 12, wherein the triggering event is an event occurring during playback of the  
10 audiovisual product.

14. The method of claim 13, wherein the triggering event is receiving a user command, or expiry of a timer.

15 15. The method of any preceding claim, further comprising the step of checking expected conformance of the audiovisual product with the predetermined output format, using the plurality of components and the plurality of transitions.

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16. The method of claim 15, wherein the predetermined output format is a hierarchical data structure having limitations on a number of objects that may exist in the data structure at each level of the  
25 hierarchy, and the checking step comprises predicting an expected number of objects at a level and comparing the expected number with the limitations of the hierarchical data structure.

30 17. The method of claim 15 or 16, wherein the checking step comprises predicting an expected total size of the audiovisual product, and comparing the expected

total size against a storage capacity of a predetermined storage medium.

18. The method of any preceding claim, wherein the  
5 expanding step comprises, for each component, building one or more of the set of explicitly realised AV assets by reading and manipulating the one or more raw content objects.

10 19. The method of any preceding claim, wherein:

the defining step comprises defining at least one choice component comprising a reference to a plurality of raw content objects and at least one authoring parameter;  
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the building step comprises:

selecting one or more raw content objects from  
20 amongst the plurality of raw content objects using the at least one authoring parameter; and

combining the selected raw content objects to form one of the AV assets.

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20. The method of claim 19, comprising repeating the selecting and combining steps to automatically build a plurality of the explicitly realised AV assets from the one of the components.

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21. The method of any preceding claim, wherein the expanding step comprises:

creating from each one of the plurality of components one or more explicitly realised AV assets to provide the set of AV assets;

5       creating the expanded intermediate data structure wherein each node represents one AV asset of the set; and

creating a set of links between the nodes.

10   22.       The method of any preceding claim, wherein each transition is associated between first and second components, and creating the set of links comprises evaluating each transition to create one or more links, each of the links being between a node created from the  
15   first component and a node created from the second component.

23.       The method of any preceding claim, wherein the expanding step comprises evaluating at least one of the  
20   transitions to create exit logic associated with at least one first node, evaluating one of the components to create entry logic associated with at least one second node, and providing a link between the first and second nodes according to the entry logic and the exit logic.

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24.       The method of claim 23, wherein at least one of the transitions is associated with a triggering event, and the expanding step comprises evaluating the triggering event to determine the exit logic associated with the at  
30   least first one node.

25.       The method of any preceding claim, further comprising the step of checking expected conformance of

the audiovisual product with the predetermined output format, using the AV assets and the expanded intermediate data structure of nodes and links.

5 26. The method of claim 25, wherein the predetermined output format is a hierarchical data structure having limitations on a number of objects that may exist in the data structure at each level of the hierarchy, and the checking step comprises predicting an  
10 expected number of objects at a level and comparing the expected number with the limitations of the hierarchical data structure.

27. The method of claim 26, wherein the checking  
15 step comprises predicting an expected total size of the audiovisual product, and comparing the expected total size against a storage capacity of a predetermined storage medium.

20 28. The method of any preceding claim, wherein the AV assets have a data format specified according to the predetermined output format.

29. The method of any preceding claim, wherein the  
25 AV assets each have a data format according to the predetermined output format, whilst the raw content objects are not limited to a data format of the predetermined output format.

30 30. The method of any preceding claim, wherein the predetermined output format is a DVD-video specification.

31. The method of any preceding claim, wherein the AV assets each comprise a video object, zero or more audio objects, and zero or more sub-picture objects.

5 32. The method of any preceding claim, wherein the AV assets each comprise at least one video object, zero to eight audio objects, and zero to thirty-two sub-picture objects, according to the DVD-video specification.

10 33. The method of any preceding claim, wherein the creating step comprises creating objects in a hierarchical data structure defined by the predetermined output format with objects at levels of the data structure, according to the intermediate data structure of nodes and links, and  
15 where the objects in the hierarchical data structure include objects derived from the explicitly realised AV assets.

34. The method of any preceding claim, wherein the  
20 predetermined output format is a DVD-video specification and the creating step comprises creating DVD-video structure locations from the nodes of the expanded intermediate data structure, placing the explicitly realised AV assets at the created structure locations, and  
25 substituting the links of the expanded intermediate data structure with explicit references to the DVD-video structure locations.

35. An authoring method for use in creating a DVD-  
30 video product, comprising the steps of:

creating a plurality of components representing parameterised sections of audiovisual content, and a

plurality of transitions representing movements between components;

5       expanding the plurality of components and the plurality of transitions to provide a set of AV assets and an expanded data structure of nodes and links, where each node is associated with an AV asset of the set and the links represent movement from one node to another; and

10       creating a DVD-video format data structure from the AV assets, using the nodes and links, wherein the DVD-video format data structure comprises data representing, or at least emulating, menu data.

15       36.       The method of claim 35 or 36, comprising creating at least one information component comprising a reference to an item of AV content.

20       37.       The method of claim 35, comprising creating at least one choice component comprising a reference to at least one item of AV content, and at least one parameter for modifying the item of AV content.

25       38.       The method of claim 37, wherein the choice component comprises a reference to a presentation template and a reference to at least one item of substitutable content to be placed in the template according to the at least one parameter.

30       39.       The method of claim 37 or 38, wherein the choice component comprises at least one runtime variable available during playback of an audiovisual product in a



DVD player, and at least one authoring parameter not available during playback.

40.           The method of any of claims 35 to 39, comprising  
5   creating at least one meta-component representing a set of components and transitions.

41.           The method of any of claims 35 to 40, wherein  
each transition represents a permissible movement from one  
10   component to another component, each transition being associated with a triggering event.

42.           The method of claim 41, wherein a triggering  
event includes receiving a user command, or expiry of a  
15   timer.

43.           The method of any of claims 35 to 42, wherein  
the expanding step comprises:

20           creating from each one of the plurality of components one or more AV assets to provide the set of AV assets;

              creating the expanded data structure wherein each  
node represents one AV asset of the set; and

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              creating a set of links between the nodes.

44.           The method of claim 37 or any claim dependent  
thereon, wherein the expanding step comprises evaluating  
30   each choice component to create a plurality of AV assets according to each value of the at least one parameter.

45.           The method of claim 44, wherein evaluating each choice component comprises creating entry logic associated with at least one node and/or evaluating at least one transition to create exit logic associated with at least one node, and providing a link between a pair of nodes  
5           according to the entry logic and the exit logic.

46.           The method of any of claims 35 to 45, comprising the step of checking expected conformance with the DVD-  
10          video format using the created components and transitions.

47.           The method of any of claims 35 to 40, comprising the step of checking expected conformance with the DVD-  
video format using the set of AV assets and the expanded  
15          data structure of nodes and links.

48.           An authoring method for use in creating an audiovisual product according to a DVD-video specification, comprising the steps of:

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          generating a set of AV assets each comprising a video object, zero or more audio objects and zero or more sub-picture objects, and an expanded data structure of nodes and links, where each node is associated with one AV asset  
25          of the set and the links represent navigational movement from one node to another; and

          creating a DVD-video format data structure from the set of AV assets, using the nodes and links;

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          the method characterised by the steps of:

creating a plurality of components and a plurality of transitions, where a component implicitly defines a plurality of AV assets by referring to a presentation template and to items of raw content substitutable in the presentation template, and the plurality of transitions represent navigational movements between components; and

expanding the plurality of components and the plurality of transitions to generate the set of AV assets and the expanded data structure of nodes and links representing, or at least emulating, at least one menu.

50. A method as claimed in any preceding claim comprising the steps of providing a data structure comprising data defining a menu structure having at least one menu having a respective number of menu items associated with a number of defined views of, or actions in relation to, a general visual asset; providing a visual asset; and creating, automatically, a number of visual assets using at least one of the visual asset provided and the data of the data structure; the visual assets created corresponding to respective views of the defined views of the visual asset provided or reflecting respective actions of the defined actions in relation to the visual asset provided.

51. A method as claimed in claim 50 in which the step of providing the visual asset comprises the step of providing at least one of image data and a video sequence.

52. A method as claimed in any of claims 50 to 51 in which the step of creating the number of visual assets

comprises the step of deriving data from the provided visual asset to produce the number of visual assets.

53. A method as claimed in claim 52 in which the step of deriving data from the provided visual asset comprises the  
5 step of copying data from the provided visual asset.

54. A method as claimed in claim 52 in which the step of deriving data from the provided visual asset comprises the step of processing the data of the visual asset such that the number of visual assets comprises respective modified  
10 data of the provided visual asset.

55. A method as claimed in any of claims 50 to 54 in which the step of creating the number of visual assets comprises the step of including, in selected visual assets of the number of visual assets, visual data representing  
15 views of selected menu items of the number of menu items.

56. A method as claimed in any of claims 50 to 55 in which the step of creating the number of visual assets comprises the step of creating sub-picture data comprising data for at least one selectable graphical element  
20 associated with a respective menu item.

57. A method as claimed in claim 56 in which the step of creating the sub-picture data comprises the step of creating, or providing, a number of selectable graphical elements associated with respective menu items.

25 58. A method as claimed in claim 57 in which the step of creating the sub-picture data comprises the step of creating a mask for selectively displaying the number of selectable graphical elements.

59. A method as claimed in any of claims 50 to 58 in which the step of creating the number of visual assets comprises the steps of associating a visual asset processing operation with selected menu items of the menu items; and deriving the data for the number of visual assets from the provided visual asset using respective visual asset processing operations.

60. A method as claimed in any of claims 50 to 59 in which the step of providing the data structure comprises the step of defining image data or video data associated with a plurality of views of the menu.

61. A method as claimed in claim 60 in which the step of defining image data or video data associated with the plurality of views of the menu comprises the step of creating image data or video data such that the plurality of views of the menu represent progressively expanding or contracting views of the menu.

62. A method as claimed in any of claims 50 to 61, further comprising the step of creating navigational data associated with, or linking, the number of visual assets according to the menu structure to allow the number of visual assets to be accessed, played or displayed according to the menu structure.

63. A method as claimed in any of claims 50 to 62, further comprising the step of providing a first number or plurality of visual assets; and creating, automatically, a second number of visual assets using the plurality of visual assets; the created visual assets corresponding to respective views of the defined views or to respective

actions of the defined actions according to the menu structure.

64. A method as claimed in any of claims 50 to 63 in which the step of providing the visual assets comprises  
5 the step of providing an audio-visual asset.

65. A method substantially as described herein with reference and/or as illustrated in any of the accompanying drawings.

66. An asset authoring system comprising means to provide  
10 a data structure comprising data defining a menu structure having at least one menu having a respective number of menu items associated with a number of defined views of, or actions in relation to, a general visual asset; means to provide a visual asset; means to create, automatically,  
15 a number of visual assets using at least one of the visual assets provided and the data of the data structure; the visual assets created corresponding to respective views of the defined views of the visual asset provided or reflecting respective actions of the defined actions in  
20 relation to the visual asset provided.

67. An asset authoring system as claimed in claim 66 in which the means to provide the visual asset comprises means to provide at least one of image data and a video sequence

25 68. A system as claimed in either of claims 66 and 67 in which the means to create the number of visual assets comprises means to derive data from the provided visual asset to produce the number of visual assets.

69. A system as claimed in claim 68 in which the means to derive data from the provided visual asset comprises means to copy data from the provided visual asset.

70. A system as claimed in claim 68 in which the means to  
5 derive data from the provided visual asset comprises means to process the data of the visual asset such that the number of visual assets comprises respective modified data of the provided visual asset.

71. A system as claimed in any of claims 66 to 70 in  
10 which the means to create the number of visual assets comprises means to include, in selected visual assets of the number of visual assets, visual data representing views of selected menu items of the number of menu items.

72. A system as claimed in any of claims 66 to 71 in  
15 which the means to create the number of visual assets comprises means to create sub-picture data comprising data for at least one selectable graphical element associated with a respective menu item.

73. A system as claimed in claim 72 in which the means to  
20 create the sub-picture data comprises means to create, or provide, a number of selectable graphical elements associated with respective menu items.

74. A system as claimed in claim 73 in which the means to  
25 create the sub-picture data comprises means to create a mask for selectively displaying the number of selectable graphical elements.

75. A system as claimed in any of claims 66 to 74 in which the means to create the number of visual assets comprises means to associate a visual asset processing

operation with selected menu items of the menu items; and means to derive the data for the number of visual assets from the provided visual asset using respective visual asset processing operations.

5 76. A system as claimed in any of claims 66 to 75 in which the means to provide the data structure comprises means to define image data or video data associated with a plurality of views of the menu.

10 77. A system as claimed in claim 76 in which the means to define the image data or the video data associated with the plurality of views of the menu comprises the means to create the image data or the video data such that the plurality of views of the menu represent progressively expanding or contracting views of the menu.

15 78. A system as claimed in any of claims 66 to 77 further comprising means to create navigational data associated with, or linking, the number of visual assets according to the menu structure to allow the number of visual assets to be accessed, played or displayed according to the menu  
20 structure.

79. A system as claimed in any of claims 66 to 78 further comprising means to provide a first number or plurality of visual assets; and means to create, automatically, a second number of visual assets using the plurality of  
25 visual assets; the created visual assets corresponding to respective views of the defined views or to respective actions of the defined actions according to the menu structure.



80. An asset authoring system as claimed in any of claims 66 to 79 in which means to provide the visual assets comprises means to provide an audio-visual asset.

81. An asset authoring system substantially as described  
5 herein with reference and/or as illustrated in any of the accompanying drawings.

82. A system for authoring visual content; the system comprising the step of creating a video sequence comprising data to display a progressively expanding menu  
10 comprising a number of menu items following invocation of a selected menu item or receipt of a user generated event and data derived from or associated with at least one of image data and a video sequence.

83. A system of authoring visual content; the system  
15 comprising the step of creating a video sequence comprising data to display a progressively contracting menu comprising a number of menu items following invocation of a selected menu item or receipt of a user generated event.

20 84. A system as claimed in either of claims 82 and 83, further comprising means to generate sub-picture graphical elements for each menu item; each sub-picture graphical element having associated position data to position the elements in a predetermined position relative to  
25 corresponding menu items when rendered and data derived from or associated with at least one of image data or a video sequence.

85. A system as claimed in any of claims 82 to 84 in which the progressively varying menu represents a pull-  
30 down menu.

86. A computer program comprising computer executable code to implement a system or method as claimed in any preceding claim.

87. A product comprising computer readable storage  
5 storing a computer program as claimed in claim 86.

88. A storage medium comprising at least visual content authored using a method, system, computer program or product as claimed in any preceding claim.

89. A storage medium comprising data representing a video  
10 sequence comprising data to display a progressively variable or dynamic menu comprising a number of menu items following invocation of a selected menu item or receipt of a user generated event; and data representing sub-picture graphical elements for each menu item; each sub-picture  
15 graphical element having associated position data to mask the elements in predetermined positions relative to corresponding menu items when rendered in response to a user-generated event.

90. A storage medium as claimed in either of claims 88  
20 and 89 in which the storage medium is an optical medium.

91. A storage medium as claimed in claim 90 in which the optical medium is a DVD product.

92. A storage medium as claimed in either of claims 88 and 89 in which the storage medium is a magnetic medium.

25 93. A storage medium as claimed in claim 92 in which the storage medium is a digital linear tape.

94. A system to manufacture a DVD product; the system comprising means to create a data carrier comprising data

representing a video sequence comprising data to display a progressively variable or dynamic menu comprising a number of menu items following invocation of a selected menu item or receipt of a user generated event; and data  
5 representing sub-picture graphical elements for each menu item; each sub-picture graphical element having an associated maskable position relative to corresponding menu items when rendered in response to a user-generated event.

10 95. A system to manufacture a DVD product; the system comprising means to read a data carrier comprising data representing at least the set of visual assets created using a method, system, computer program, computer program product or storage medium as claimed in any preceding  
15 claim; and means to materially produce the DVD product using the data stored on the data carrier.

96. A DVD product comprising data representing a video sequence comprising data to display a progressively variable or dynamic menu comprising a number of menu items  
20 following invocation of a selected menu item or receipt of a user generated event; and data representing sub-picture graphical elements for each menu item; each sub-picture graphical element having an associated maskable position relative to corresponding menu items when rendered in  
25 response to a user-generated event.

97A data structure substantially as described herein with reference to and/or as illustrated in the accompanying drawings.